JOHN FLUKE MFG. CO., INC.
P. O. BOX 7161 SEATTLE 33, WASH.

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JOHN FLUKE MFG. CO., INC.
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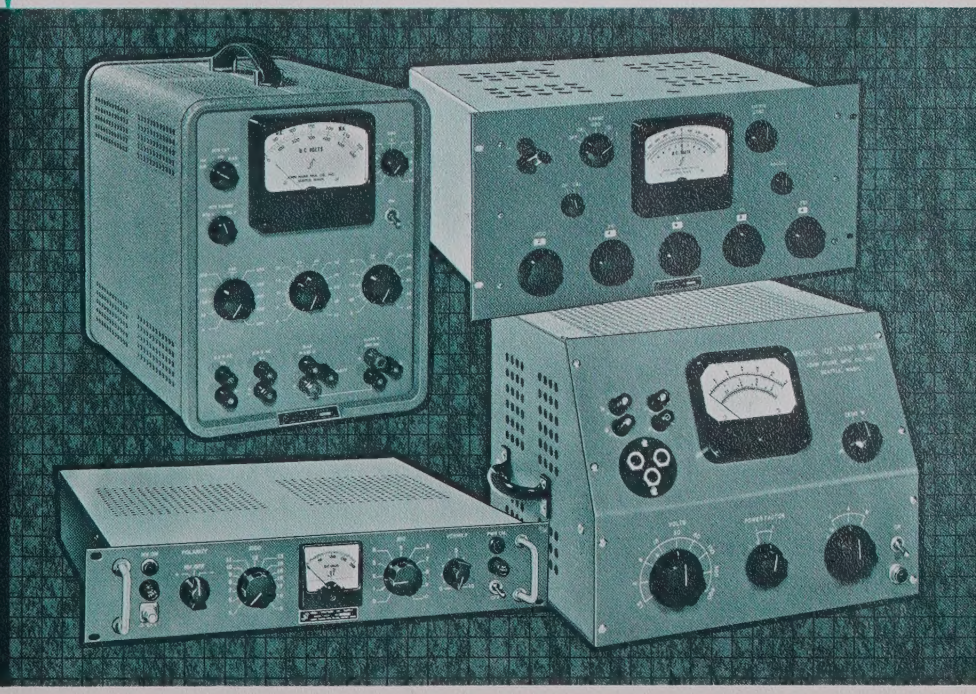
JOHN FLUKE

jf 1960 CATALOG

SHORT FORM

- VAW METER
- POWER SUPPLIES
  - General Purpose
  - Precision Meter Calibrator
  - High Voltage—Nuclear
  - Constant Current
- PRECISION DC-AC DIFFERENTIAL VOLTMETERS



SERVING SCIENCE AND INDUSTRY IN...

electronics

VAW METER

The jf Model 102 VAW Meter is a wide range electronic instrument for the measurement of voltage, current, and power. This instrument has a maximum true power sensitivity of 225 microwatts and will measure up to 18 kilowatts over the frequency range of 20 CPS to 100 KC. With a one megohm input resistance and a shunt drop of only 45 millivolts full scale, the Model 102 generally produces negligible insertion loss effects on the circuit under test. The VAW Meter is ideally suited to measuring true power consumed by a wide variety of loads including both linear and non-linear elements such as servo components, transformers, rectifiers, and substantially any power consuming circuit configuration.

MODEL	VOLTAGE (full scale)	CURRENT (full scale)	POWER	POWER FACTOR RANGE	FREQUENCY RESPONSE	ACCURACY	INPUT IMPEDANCE	PRICE
102	1.5-600V	1.5ma-30A	225uw to 18KW	1.0	20CPS—100KC	3%	1 Megohm 25uufd	$555.00
				0.1	20CPS—20KC	3%		
					20KC—40KC	5%		

POWER SUPPLIES

John Fluke power supplies have achieved a position of universal acceptance in the fields of production testing, general laboratory development, and nuclear research. The complete line of jf laboratory and nuclear supplies range in output from 0 to 10 kilovolts and 0 to 400 milliamperes. These units have regulation and stability in the order of 0.005%.

Continued development of new concepts and an acute awareness of the needs of the engineer have established jf as a pioneer in instrument development. Use of highest quality components, conservative design practice, skilled craftsmanship, and stringent quality control have led to jf supplies being recognized as the standard of the industry.

GENERAL PURPOSE

MODEL 406 0-530V 0-100 ma

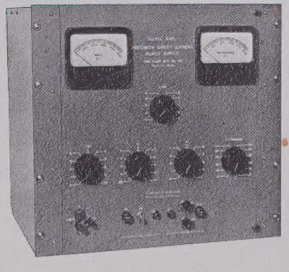
GENERAL PURPOSE

MODEL 407 0-555V 0-300 ma

PRECISION METER CALIBRATOR

MODEL 301E 1.02-512V 0-300 ma

PRECISION METER CALIBRATOR



MODEL 301C 1.02-1012V 0-400 ma

CONSTANT CURRENT

MODEL 351A 0-100 ma 0-100V

HIGH VOLTAGE-NUCLEAR

MODEL 409A 170-1530V 0-3 ma

MODEL 80 VOLT BOXES

MODEL 80 VOLT BOXES

Both the Model 800 and the Model 801 differential voltmeters may be used to measure voltages in excess of 500 volts by using an appropriate voltage divider or "volt box" to attenuate the EMF under measurement to 500 volts or less.

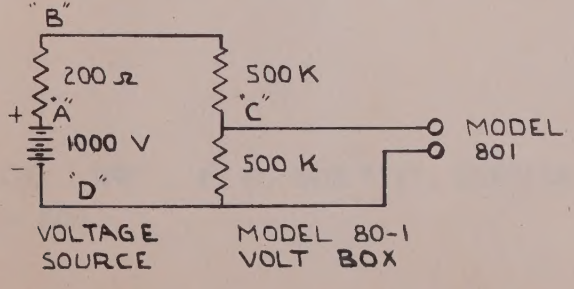
The three chief requirements of a voltage divider or "volt box" for use with the Models 800 and 801 are extreme accuracy of the division ratio, very low temperature coefficient of resistance, and excellent long term stability. The last two requirements automatically rule out all composition, deposited carbon and metal film resistors. The only type suitable is a properly aged precision wirewound unit wound with Evanohm or equivalent alloy.

The John Fluke Mfg. Co. has made available a series of volt boxes which meet the above requirements. These are the Model 80 series, and a list of the ranges available follows:

MODEL NO.	DIVISION RATIO	MAXIMUM INPUT	TOTAL RES.	CURRENT DRAWN AT MAX. INPUT	PRICE
80 - 1	2:1	1 KV	1 megohm	1 MA	$ 60
80 - 2	4:1	2 KV	2 megohms	1 MA	70
80 - 3	6:1	3 KV	3 megohms	1 MA	80
80 - 4	8:1	4 KV	4 megohms	1 MA	90
80 - 5	10:1	5 KV	5 megohms	1 MA	100
80 - 6	2:1	1 KV	10 megohms	0.1 MA	120

The division ratio of all models is accurate to .01% and long term stability is better than .01% per year. All models are housed in black phenolic boxes measuring 5-1/4" wide x 6-3/4" long x 2-1/4" deep. Output terminals are General Radio polystyrene on 3/4" centers, and the input is brought out by a pair of 6 foot flexible leads. The "hot" lead is made of a special high voltage wire insulated for better than 10 KV.

Naturally, any d-c voltage divider has resistance; the resistance of each Model 80 volt box is shown in column 4 above. The effect of this resistance is twofold. First, it affects the source under measurement since it "loads" it slightly. Second, it affects the meter used to measure the attenuated voltage since it appears to the meter as source resistance. In the case of the 800 and 801, this "source" resistance has no effect at null; it does affect the accuracy in the "search" ranges however, since the input resistance of the 800 and 801 in the 500V search position is 10 megohms. To illustrate, consider a 1,000 volt source with 200 ohms internal resistance being measured by the Model 800 used with the Model 80 - 1 volt box.



This is a simple two mesh circuit, the solution of which is shown below.

	(1) DIVIDER DISCON-NECTED	(2) DIVIDER ONLY CONNECTED	(3) DIVIDER AND 800 IN SEARCH	(4) DIVIDER AND 800 AT NULL
SOURCE EMF EAD	1000.0V	1000.0V	1000.0V	1000.0V
TERMINAL VOLTAGE EBD	1000.0V	999.80V	999.79V	999.80V
% ERROR (WRT EAD)	0%	.020%	.021%	.020%
DIVIDER OUTPUT ECD	-	499.9V	487.7V	499.9V
% ERROR (WRT EAD)	-	.02%	2.46%	.02%

CONCLUSION: The volt box has a definite loading effect on the source under measurement. If the internal resistance of the source is known, the loading error can be computed and final readings corrected accordingly. In the case above this loading error is .02%.

The Model 800 at null presents an infinite impedance to the source under measurement, in this case the divided down voltage. Therefore, there is no additional error caused by voltmeter loading. This is clearly indicated by comparing the values under headings (2) and (4) - the output of the divider with the 800 or 801 connected and brought to a null is exactly the same as the calculated output with nothing connected to the divider.

JOHN FLUKE MFG. CO., INC., P. O. BOX 7161, SEATTLE 33, WASHINGTON
Form 311B - 5/2/58 - 200

WARRANTY

The JOHN FLUKE MFG. CO., INC. warrants each instrument manufactured by them to be free from defects in material and workmanship. Their obligation under this Warranty is limited to servicing or adjusting an instrument returned to their factory for that purpose, and to making good at their factory any part or parts thereof; except tubes, fuses, choppers and batteries, which shall, within one year after making delivery to the original purchaser, be returned by the original purchaser to them with transportation charges prepaid, and which on their examination shall disclose to their satisfaction to have been thus defective. If the fault has been caused by misuse or abnormal conditions of operation repairs will be billed at cost. In this case, an estimate will be submitted before work is started, if requested.

If any fault develops, the following steps should be taken:

1. Notify us, giving full details of the difficulty, and include the Model number, type number, and serial number. On receipt of this information we will give you service data or shipping instructions.

2. On receipt of the shipping instructions, forward the instrument prepaid, and repairs will be made at the factory. If requested, an estimate of the charges will be made before the work begins, provided the instrument is not covered by the Warranty.

SHIPPING

All shipments of JOHN FLUKE MFG. CO., INC. instruments should be made via Railway Express prepaid. The instrument should be shipped in original packing carton, or if not available any suitable container that is rigid. If substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material.

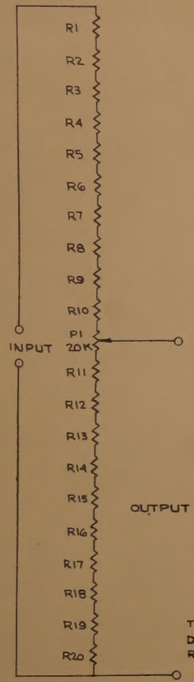
CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be thoroughly inspected immediately upon receipt of same. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. Include Model number, type number, and serial number when referring to this instrument for any reason.

Do not hesitate to contact us concerning any questions which you may have about this instrument. The JOHN FLUKE MFG. CO., INC. will be happy to answer all application questions which will enhance your use of this instrument.

JOHN FLUKE MFG. CO., INC., P. O. BOX 7161, SEATTLE 33, WASHINGTON

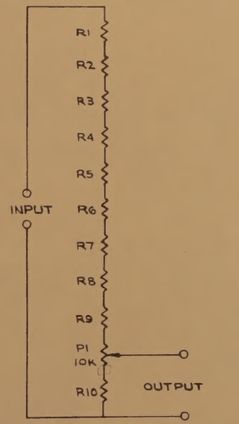
Form 314



NOTE: R1-R20 = 500K, 1W, .5% WW

80-6

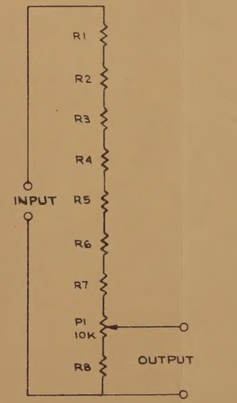
TOTAL RESISTANCE = 10M ± .5%
DIVISION RATIO = 2:1
RATIO ACCURACY = .01%



NOTE: R1-R10 = 500K, 1W, .5% WW

80-5

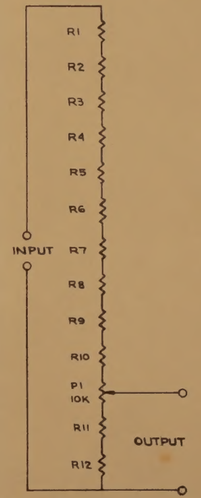
TOTAL RESISTANCE = 5M ± .5%
DIVISION RATIO = 10:1
RATIO ACCURACY = .01%



NOTE: R1-R8 = 500K, 1W, .5% WW

80-4

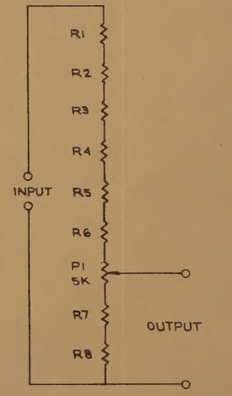
TOTAL RESISTANCE = 4M ± .5%
DIVISION RATIO = 8:1
RATIO ACCURACY = .01%



NOTE: R1-R12 = 249K, 1W, .5% WW

80-3

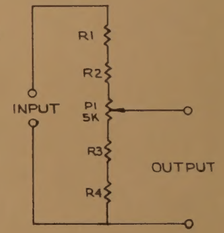
TOTAL RESISTANCE = 3M ± 1%
DIVISION RATIO = 6:1
RATIO ACCURACY = .01%



NOTE: R1-R8 = 249K, 1W, .5% WW

80-2

TOTAL RESISTANCE = 2M ± 1%
DIVISION RATIO = 4:1
RATIO ACCURACY = .01%



NOTE: R1-R4 = 249K, 1W, .5% WW

80-1

TOTAL RESISTANCE = 1M ± .5%
DIVISION RATIO = 2:1
RATIO ACCURACY = .01%

JOHN FLUKE MFG. CO. INC.
SEATTLE, WASH.

MODEL 80-1, -2, -3, -4, -5 & -6
VOLT BOX CIRCUIT DIAGRAMS

DWG. BY W.M. | DATE 8/23/63 | DWG NO. 80-101

GENERAL PURPOSE - PRECISION DC LABORATORY POWER SUPPLIES

JOHN FLUKE

MODEL	VOLTAGE	CURRENT	REGULATION		STABILITY PER HOUR	MAX. RIPPLE RMS	RESOLUTION	PRICE
			LINE	LOAD				
406	0-530V	0-100 ma	0.01%	0.01%	0.01%	1mv	2mv	$285.00
407	0-555V	0-300 ma	0.01%	0.01%	0.01%	1mv	2mv	$335.00
301E	1.02-512V	0-300 ma	0.005%	0.005%	0.005%	2mv	50uv	$695.00
301C	1.02-1012V	0-400 ma	0.005%	0.005%	0.005%	2mv	50uv	$985.00

CONSTANT CURRENT POWER SUPPLY

MODEL	CURRENT	VOLTAGE	REGULATION		STABILITY PER HOUR	MAX. RIPPLE RMS	RESOLUTION	PRICE
			LINE	LOAD				
351A	0-100 ma	0-100V	0.01%	0.01%	0.005%	0.05% plus 0.5ua	1ua	$845.00

HIGH VOLTAGE NUCLEAR SUPPLIES

MODEL	VOLTAGE	CURRENT	REGULATION		STABILITY PER HOUR	MAX. RIPPLE RMS	RESOLUTION	PRICE
			LINE	LOAD				
409A	170-1530V	0-3 ma	0.01%	0.4%	0.02% (Per Day)	0.002%	85V steps	$335.00
402M	500-1600V	0-1 ma	0.03%	0.03%	0.01%	5mv	100mv	$320.00
404M	500-2000V	0-5 ma	0.01%	0.01%	0.005%	5mv	100mv	$435.00
412A	500-2010V	0-15 ma	0.01%	0.01%	0.005%	5mv	10mv	$455.00
405	600-3100V	0-15 ma	0.01%	0.005%	0.005%	5mv	10mv	$595.00
408A	500-6010V	0-20 ma	0.01%	0.01%	0.005%	5mv	10mv	$695.00
410A	1000-10,010V	0-10 ma	0.01%	0.01%	0.005%	5mv	10mv	$1095.00

HIGH VOLTAGE-NUCLEAR

MODEL 402M 500-1600V 0-1 ma

HIGH VOLTAGE-NUCLEAR

MODEL 404M 500-2000V 0-5 ma

HIGH VOLTAGE-NUCLEAR

MODEL 412A 500-2010V 0-15 ma

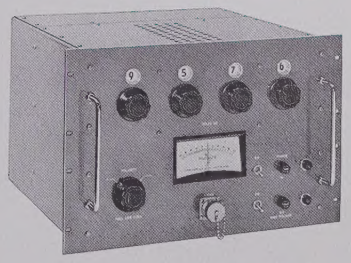
HIGH VOLTAGE-NUCLEAR

MODEL 405 600-3100V 0-15 ma

HIGH VOLTAGE-NUCLEAR

MODEL 408A 500-6010V 0-20 ma

HIGH VOLTAGE-NUCLEAR



MODEL 410A 1-10.01KV 0-10 ma

PRECISION

DIFFERENTIAL VOLTMETERS

JOHN FLUKE

PRECISION DC DIFFERENTIAL VOLTMETERS

The Models 801 and 801H Precision DC Differential Potentiometric Voltmeters are sensitive, high resolution instruments permitting rapid measurement of DC voltage. Accuracy is 0.05% of any input voltage over the range of 0.1 to 500 volts. Extreme accuracy and stability are achieved by advanced circuit design which incorporates a chopper stabilized null amplifier and a standard cell reference. For added convenience these models are available in either cabinet or rack mounting configurations.

MODEL **801**

MODEL **801H**

801 SPECIFICATIONS

VOLTAGE RANGES:	0.5, 5, 50, and 500V DC
ACCURACY:	±0.05% from 0.1 to 500V ±0.1% or 50uv, whichever is greater, below 0.1V
NULL SENSITIVITY RANGES:	10V, 1V, 0.1V, and 0.01V
MAX. METER RESOLUTION:	50uv
INPUT IMPEDANCE:	Infinite at null
DIMENSIONS:	Cabinet—9¾" W x 13" H x 14" D Rack—19" W x 8¾" H x 13¼" D
WEIGHT:	Cabinet—25 lbs., Rack—28 lbs.
PRICE:	Cabinet—$485.00, Rack—$505.00

801H SPECIFICATIONS ARE THE SAME AS FOR THE 801 EXCEPT:

NULL SENSITIVITY RANGES:	10V, 1V, 0.1V, 0.01V, and 0.001V
MAX. METER RESOLUTION:	5uv
PRICE:	Cabinet—$555.00, Rack—$575.00

PRECISION DC-AC DIFFERENTIAL VOLTMETERS

The Model 803 DC-AC Differential Voltmeter is a compact, portable voltmeter designed for precise measurement of DC or AC voltages. Ease of operation and inherent protection from accidental overload, combined with an accuracy of 0.2% for AC voltages and 0.05% for DC voltages, make this a truly versatile instrument. The Model 803 may be used as a vacuum tube voltmeter, as a differential DC voltmeter, or as a differential AC voltmeter. This model is available in either cabinet or rack mounting.

MODEL **803**

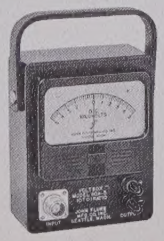
803 SPECIFICATIONS

VOLTAGE RANGES:	AC—5, 50, and 500V DC—0.5, 5, 50, and 500V
ACCURACY:	AC—±0.2% from 0.5 to 500 VAC, 30 CPS to 5 KC DC—±0.05% from 0.1 to 500VDC ±0.1% or 50uv, whichever is greater, below 0.1V
NULL SENSITIVITY RANGES:	AC—100V, 10V, 1V, 0.1V, and 0.01V DC—10V, 1V, 0.1V, and 0.01V
MAX. METER RESOLUTION:	50uv
INPUT IMPEDANCE:	AC—1 Megohm, 25uufd DC—Infinite at null
DIMENSIONS:	Cabinet—9¾" W x 13" H x 16" D Rack—19" W x 8¾" H x 17 5/16" D
WEIGHT:	Cabinet—30 lbs., Rack—33 lbs.
PRICE:	Cabinet—$875.00, Rack—$895.00

ACCESSORIES

MODEL 80A VOLT BOXES

The jf 800 series differential voltmeters may be used to measure DC voltages in excess of 500 volts by utilizing an appropriate voltage divider (Volt Box). The division ratio of all models is accurate to 0.01% and long term stability is better than 0.01% per year. The approximate magnitude and the polarity of the unknown high voltage may be easily observed with the newly incorporated center zero panel meter.



MODEL **80A**

Model No.	Division Ratio	Maximum Input	Total Resistance	Price
80A-1	2:1	1 KV	1 Megohm	$ 60.00
80A-2	4:1	2 KV	2 Megohms	$ 70.00
80A-3	6:1	3 KV	3 Megohms	$ 80.00
80A-4	8:1	4 KV	4 Megohms	$ 90.00
80A-5	10:1	5 KV	5 Megohms	$100.00
80A-6	2:1	1 KV	10 Megohms	$120.00

The right is reserved, without notice, to make such changes in equipment, design, or components as engineering or manufacturing progress may warrant.

LITHO U.S.A.-45M-C260-1

Prices subject to change without notice.